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UPDATE FOR SCALLOP FISHERY AREA/TIME CLOSURE TO REDUCE YELLOWTAIL FLOUNDER BY-CATCH ON GEORGES BANK IN 2011

Context

An area of Georges Bank, approximately 100 nautical miles^2, was closed to the offshore scallop fishery during June 2010 to reduce yellowtail flounder by-catch. The closure area was determined following a review of yellowtail flounder distribution, particularly at spawning time via observed groundfish trips from the otter trawl fleet (2005 – 2009) and observed scallop fishing trips on Georges Bank (2001-2009, except 2003). Temporal trends in the distribution of the offshore scallop fishery between 1997 and 2009 were also considered.

This report provides an update to the 2010 report (DFO, 2010) on the scallop fishery area/time closure to reduce yellowtail flounder by-catch on Georges Bank. This report considers the 2010 observed by-catch data from both the groundfish and scallop fishery and the distribution of the scallop fishery in 2010. Data from 2010 was used to ascertain possible trends in yellowtail flounder distribution, especially during the second quarter (April to June) when yellowtail flounder is known to spawn (O'Brien et al., 1993).

Response

Yellowtail Flounder By-catch in the Groundfish Fishery

While observer coverage of the otter trawl fishery extends back to earlier years, the time series of by-catch rates used to examine the spatial distribution of yellowtail flounder starts in 2005 when coverage increased significantly. Threshold values of by-catch rates have been steadily rising since 2005, and a 10 kg/hour rate was considered appropriate to use since 2007 compared to a 5 kg/hour rate used for 2005–2006. Adult yellowtail flounder biomass increased to the highest biomass since 1974, 14,600 mt, at the beginning of 2010. This is significantly lower than the biomass estimate provided last year, due to the reduction in the estimated strength of the 2005 yellowtail flounder year class and changes in the estimation procedures (TRAC, 2010).

2010 observer coverage for the groundfish otter trawl fleet increased to 1301 sets (Table 1) from 1125 sets in 2009. In 2010, the majority (91%) of the observed sets were from 5Zj and was mainly limited to the northern part of 5Zj except for June, July and August. Observed sets occurred in all months except March, April and May (Table 1; note: there is no groundfish fishery on 5Z from about the 2nd week of Feb to end of May). Of the 1301 sets observed in 2010, 80% caught no yellowtail flounder compared to 79% in 2009, 69% in 2008, 76% in 2007, and 78% in 2006. As in previous years, by-catch rates were standardised to catch per hour (kg/hour). It is possible to compare by-catch rates across month and cells (5 min longitude x 3.33 min latitude) since set locations are provided. Observed sets occurred in all months except March, April and May in 2010 (Table 1). Yellowtail flounder were present in the observed sets for all months except February and September.

The highest average catch rate occurred in June for both 5Zj and 5Zm for 2010 (3.59 and 5.00 kg/hour, respectively) (Figure 1). However, in 5Zm, there were only 4 months with observer coverage. Of these 4 months, yellowtail flounder was observed in June, July and August (Table 1, Figure 1). Average catch rates in 5Zj in 2010 were low in January and February, peaked in June, declined in July, increased for August and October, and then returned to low levels (Figure 1). The highest monthly average catch rate in 5Zj in 2010 was 3.59 kg/hour, higher than in 2009 but lower than in the previous two years (4.01, 7.83, 2.30 kg/hour for 2007, 2008 and 2009, respectively). For 5Zm, the 2010 monthly average catch rate (5.00 kg/hour) was considerably lower than in 2009 and 2007 (15.07, 6.83, 18.55 kg/hour for 2007, 2008 and 2009, respectively).

The 2010 maximum catch rate in 5Zj (64.76 kg/hour, Table 1) has increased from that in 2009 (56.36 kg/hour), while decreasing in 5Zm (31.10 versus 49.28 kg/hour in 2009). In 2010, the maximum catch rate occurred in June for both areas. The maximum catch rate also occurred in June for 2005, 2006, 2008 (5Zm) and 2009, while for 2007 and 2008 (5Zj) they occurred in July. June and July were the only months that had cells with catch rates equal to or greater than 5 kg/hour, 5 cells ranging from 6.29 to 13.75 kg/hour (Figure 2).

Observed otter trawl sets in June from 2005 to 2010 covered all of 5Zj, while coverage was limited to the western portion of 5Zm (Figure 3). In Figure 3, cells are shaded according to average by-catch rate for the month of June from 2005 to 2010 combined. Nine cells, labelled in descending order, on the Canadian portion of Georges Bank have an average by-catch rate greater than 10 kg/hour. These range from 10.32 to 165.44 kg/hour. A cluster of 5 cells in 5Zm is in the vicinity of the Yellowtail Hole. The high catch rate cells in 5Zj are less aggregated: two cells are adjacent and two are by themselves. The by-catch rate of cell 1 is extremely high (165.44 kg/hour) compared to the other cells. This estimate is driven by observations in June 2006 (320 kg/hour). The by-catch rate of cell 8, adjacent to cell 1, is significantly lower at 10.50 kg/hour. By-catch rates for cells 2 to 9 range from 10.32 to 26.67 kg/hour during the period considered.

Yellowtail Flounder By-catch in the Offshore Scallop Fishery

Throughout 2010, 1 to 2 fishing trips per month were observed in the offshore scallop fleet. There was slightly more coverage of 5Zm in 2010 than in 2009 (Figure 4; DFO, 2010). In 2010, there were cells (5 min longitude x 3.33 min latitude) with a by-catch rate greater than 5 kg/dredge in April, May and June (1, 4 and 3 cells, respectively) (Figure 4). The 2010 offshore scallop monthly by-catch data was combined with the data from 2001 to 2009, except 2003. From this scenario, there was 1 cell with catch rates greater than 50 kg/dredge, which occurred in April (Figure 5).

Estimated annual discards of yellowtail flounder in the scallop fishery increased in 2010 to 200 t, the highest level since 2006. In 2005, 246 t were discarded, in 2006 discards increased to 504 t, in discards declined 2007 to 95 t, in 2008 they increased to 117 t, and then declined in 2009 to 84 t (Gavaris et al., 2009, Van Eeckhaute et al,. 2010).

Monthly average by-catch rates from observed scallop trips from 2001 to 2010 are much less indicative of yellowtail flounder density distribution than otter trawl observed trips. This is due to less extensive spatial coverage of the observed scallop trips and by-catch avoidance protocols put in place by the offshore scallop fleet.

Catches of the Offshore Scallop Fishery

Second quarter scallop catch data for 2010 (Figure 6) was integrated with the past years' series where the catch data for the second quarter of the year was aggregated in (5 min longitude x 3.33 min latitude) cells (Figure 7). Second quarter catches (1800 tonnes of meats) were 34% of the total 2010 landings, with fishing activities highly concentrated in zone 5Zj (Figure 6). 2010 second quarter catch data are consistent with previously observed spatial patterns from 1997 to 2010 inclusive (Figure 7). Cells in the northern part of Georges Bank have higher catches than cells located in the southern part. Cells in Georges Bank 'a' also have higher catches than cells in Georges Bank 'b'. With the inclusion of the 2010 catch data the cells with an average catch over 50 t are the same as in the previous report, with the addition of one cell.

Conclusions

Yellowtail flounder by-catch trends from observed groundfish otter trawl fishery and scallop fishery trips for the last 6 years (2005-2010) can be used to inform on areas of high yellowtail densities. Maximum by-catch rates in the otter trawl fishery have increased in 2010 in 5Zj and decreased in 5Zm, compared to 2009. The highest average yellowtail flounder catch rate occurred in June for both 5Zj and 5Zm for 2010. In the 2010 scallop fishery there were 8 cells (April, May and June) with a yellowtail flounder by-catch rate greater than 5 kg/dredge.

Impacts of the June 2010 area/time closure are as follows: four cells were closed in 2010 compared with 3 cells in 2009. In 2010, the three cells that were closed in 2009 were closed again, plus an additional cell was closed on the north-west portion of the bank. The five cells located in the vicinity of the Yellowtail Hole did not require closing as the offshore scallop fleet did not plan to fish this area in June. In total, four cells were closed in 5Zj causing fishing activities to be displaced.

Given the by-catch rates from the otter trawl fishery as an established proxy for yellowtail flounder density and distribution, 9 cells with rates greater than 10 kg/hour could qualify for an area/time closure in 2011. All of these cells are the same location as in 2010, although the rankings have changed. The closure of the cluster of cells 2, 3, 4, 7, and 9 located in the vicinity of the Yellowtail Hole would have a minimal impact on scallop fishing activities (Figure 8). The majority of fishing activity takes place in 5Zj where cells 1, 5, 6, and 8 are located. These four cells are located in areas of important commercial scallop aggregations. Cell 6 is located in an area of particular interest as the voluntary closures which have been in place for several years (indicated in red in Figure 8) have been lifted as of April 2011.

Sources of Information

DFO. 2010. Update for Scallop Fishery Area/Time Closure to Reduce Yellowtail Flounder By-catch on Georges Bank in 2010. DFO Can. Sci. Advis. Sec. Sci. Resp. 2010/010.

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O'Brien L., L.J. Burnett and R.K. Mayo. 1993. Maturation of nineteen species of finfish off the Northeast coast of the United States, 1985-1990. NOAA Technical Report NMFS 113: 66 p.

TRAC. 2010. Georges Bank Yellowtail Flounder. TRAC Status Rep. 2010/05.

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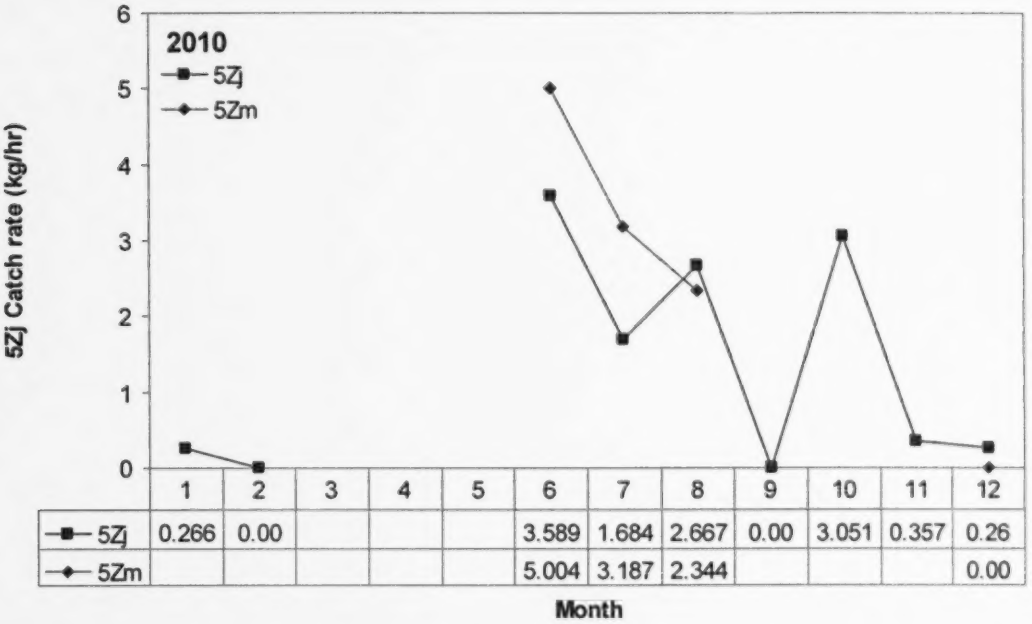
Table 1: Number of observed otter trawl sets and maximum yellowtail flounder catch rate (kg/hour) by month in 2010 in unit areas 5Zj and 5Zm.

	Number of sets			Maximum catch rate (kg/hour)	
	Unit Area			Unit Area	
Month	5Zj	5Zm	Total	5Zj	5Zm
1	199		199	0.32	
2	40		40	0.00	
3					
4					
5					
6	253	56	309	64.76	31.10
7	208	24	232	9.73	10.65
8	167	37	204	10.00	6.34
9	55		55	0.00	
10	105		105	5.17	
11	70		70	0.65	
12	86	1	87	0.28	0.00
Total	1183	118	1301		



	1	2	3	4	5	6	7	8	9	10	11	12
5Zj	0.266	0.00				3.589	1.684	2.667	0.00	3.051	0.357	0.26
5Zm						5.004	3.187	2.344				0.00

Figure 1: Average yellowtail flounder catch rate (kg/hour) by month and unit area for observed otter trawl sets in 2010. There was only one observed set in December in 5Zm.

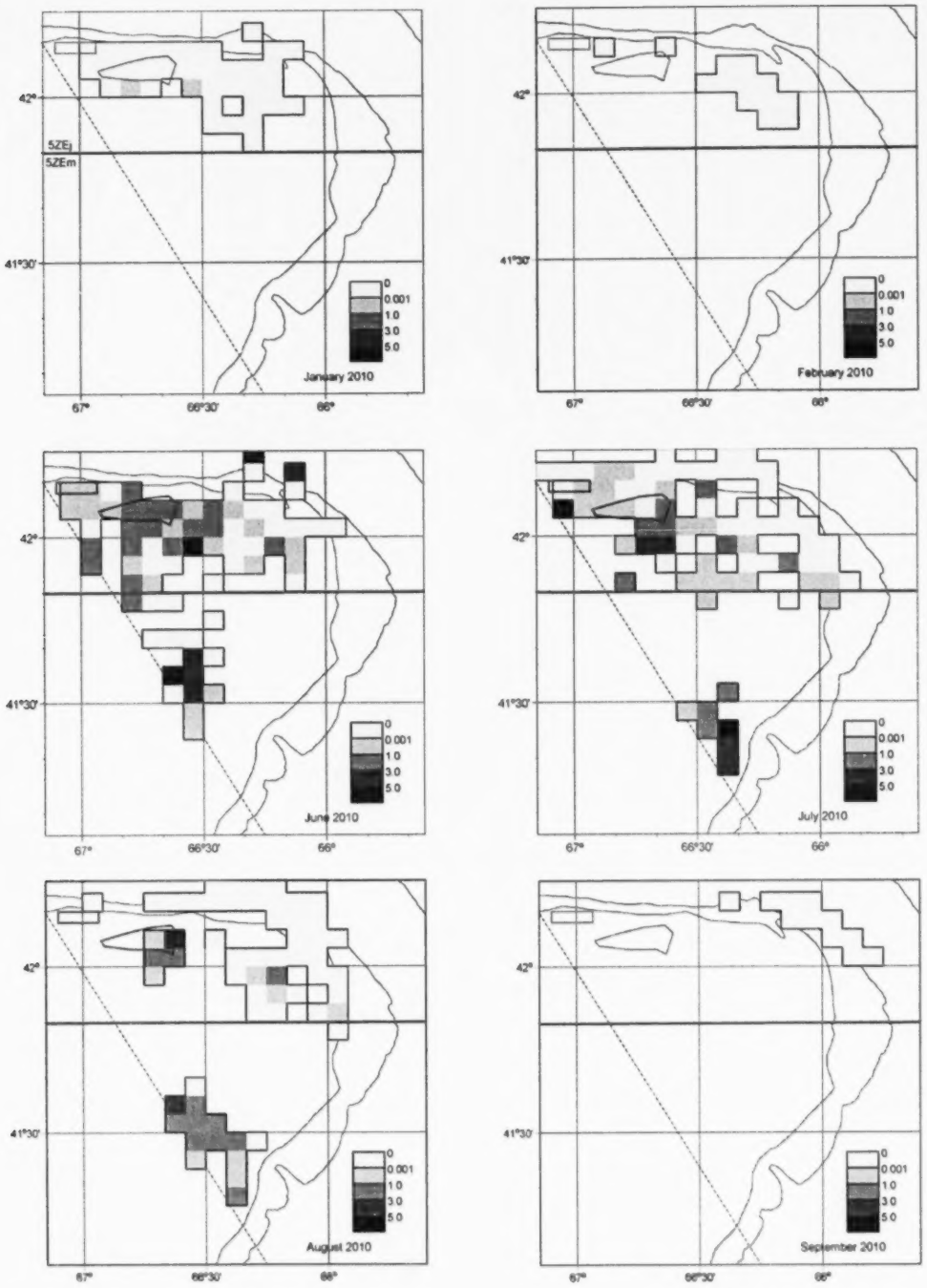


Figure 2: Average by-catch rates (kg/hour) for yellowtail flounder in 2010 for observed otter trawl sets on Georges Bank. The areas outlined in red are the voluntary scallop seed closure areas that were in place in 2010. (There was no groundfish fishery from February 8th to May 31st).

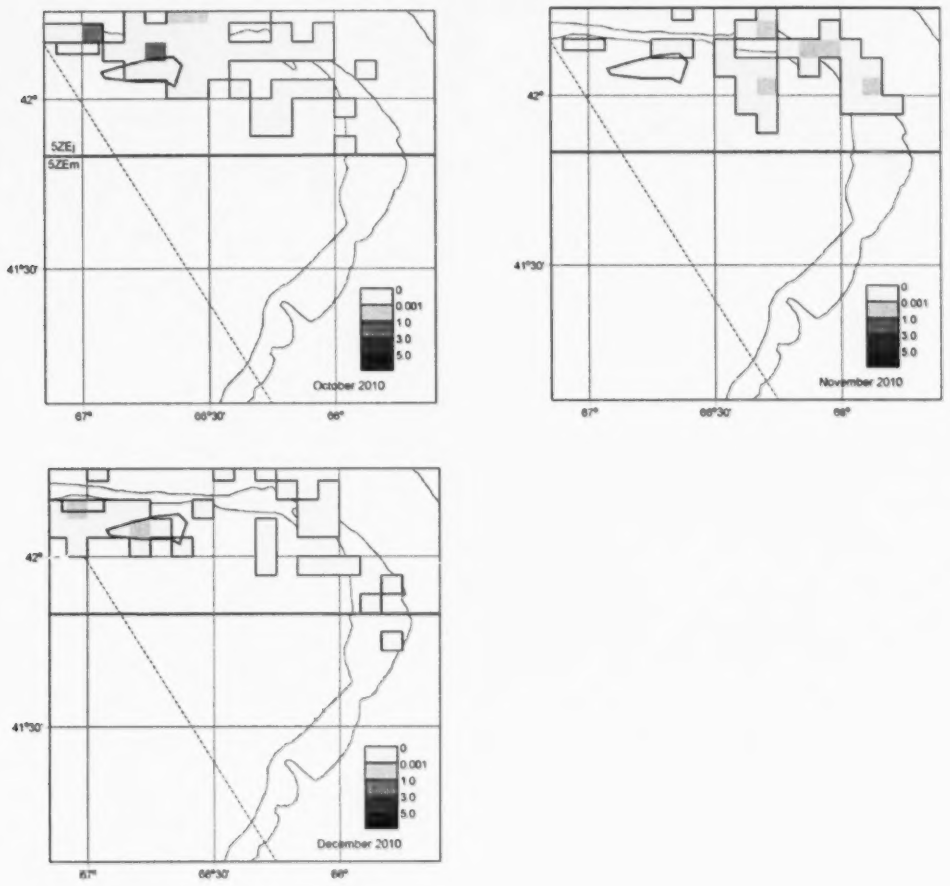


Figure 2. (Continued).

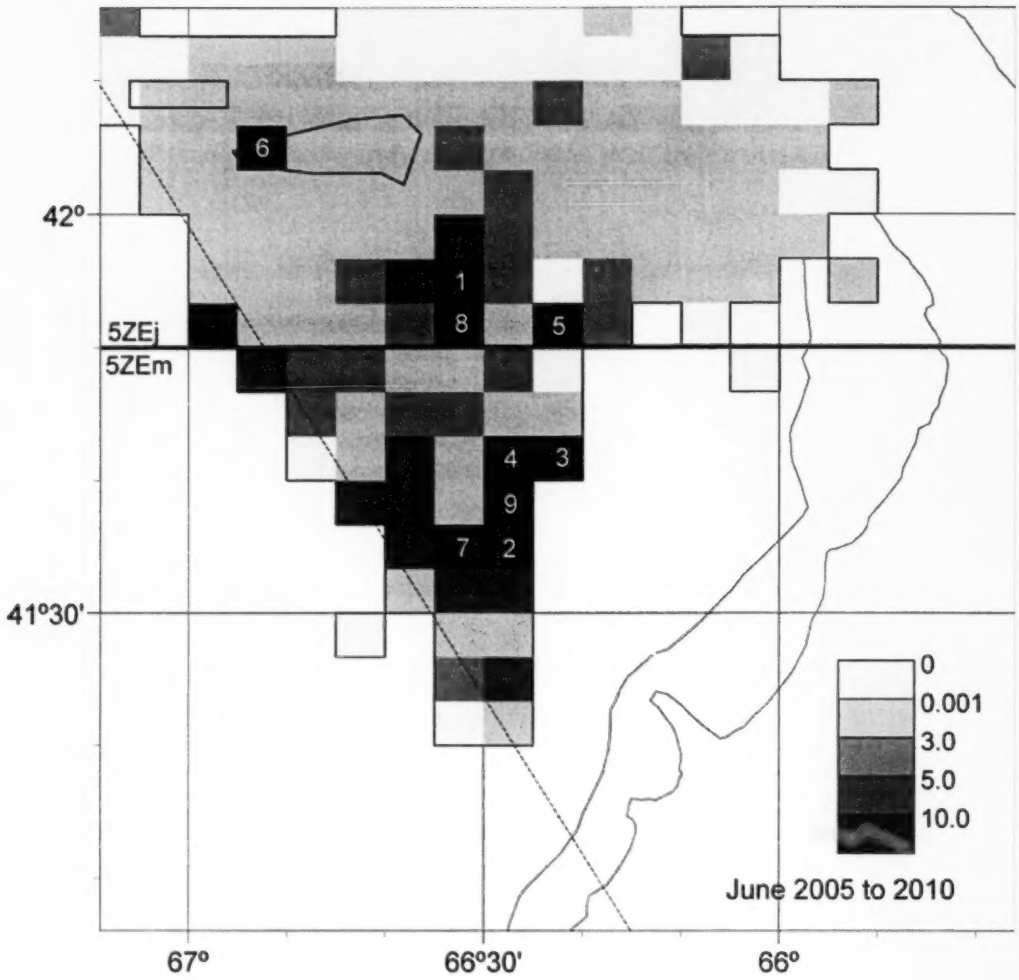


Figure 3: Average yellowtail flounder by-catch rates (kg/hour) for the months of June during 2005 to 2010 for observed otter trawl sets on Georges Bank. Cells located on the Canadian side with rates greater than 10 kg/hour are labelled in descending order. The areas outlined in red are the voluntary scallop seed closure areas that were in place in 2010.

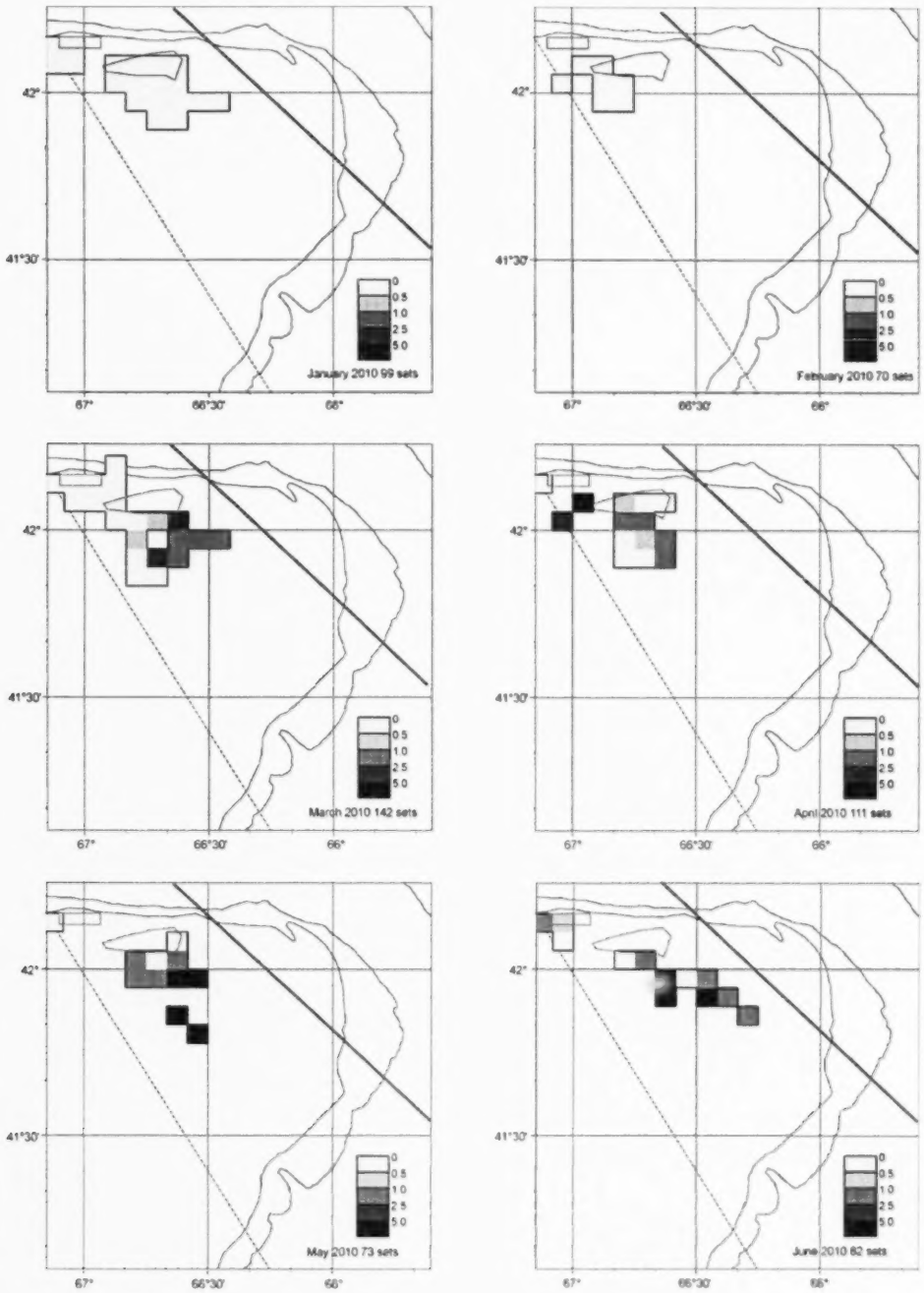
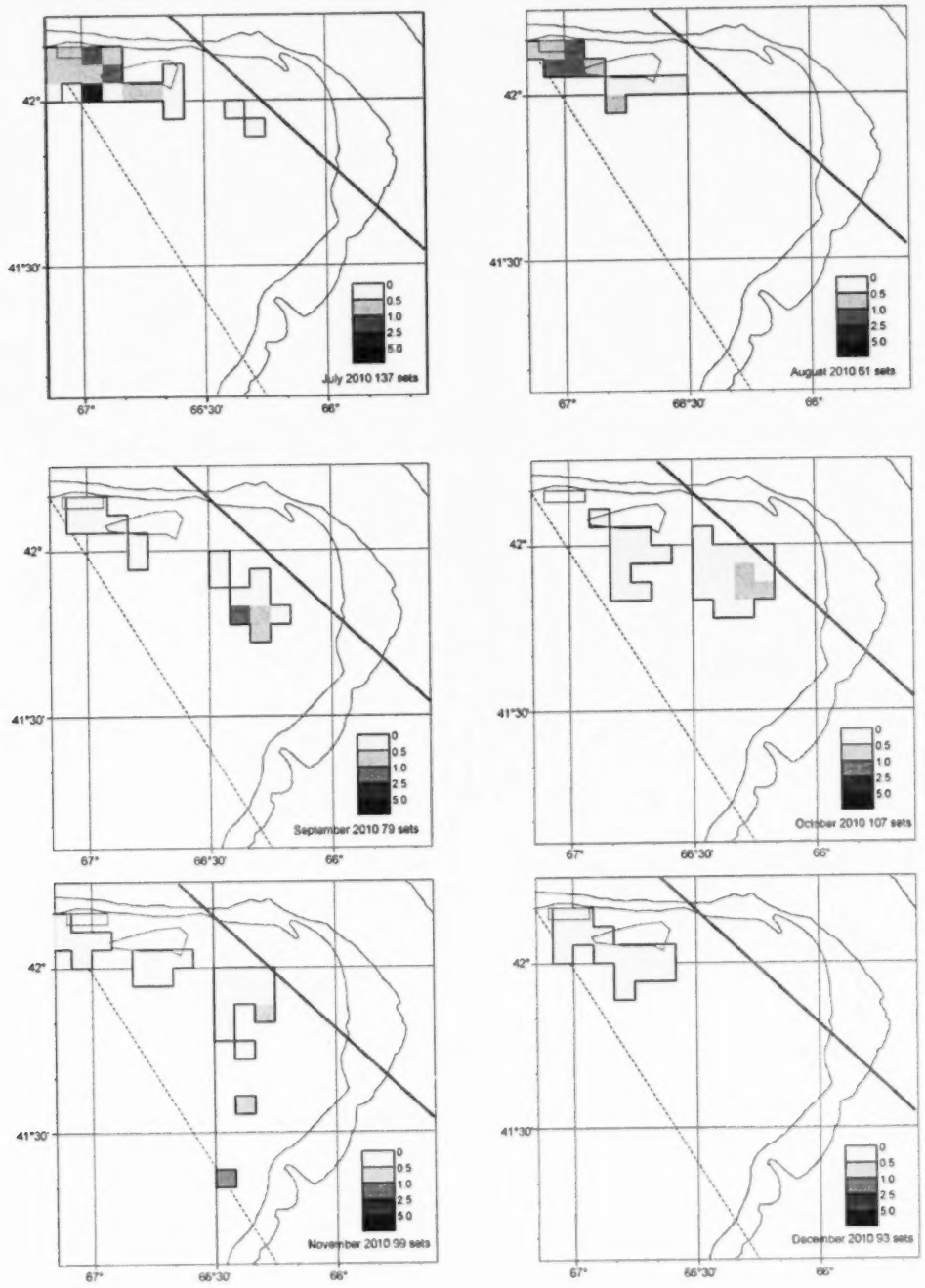


Figure 4: Average by-catch rates (kg/dredge) of yellowtail flounder on a monthly basis in 2010 from observed scallop trips on Georges Bank. The areas outlined in red are the voluntary scallop seed closure areas that were in place in 2010.



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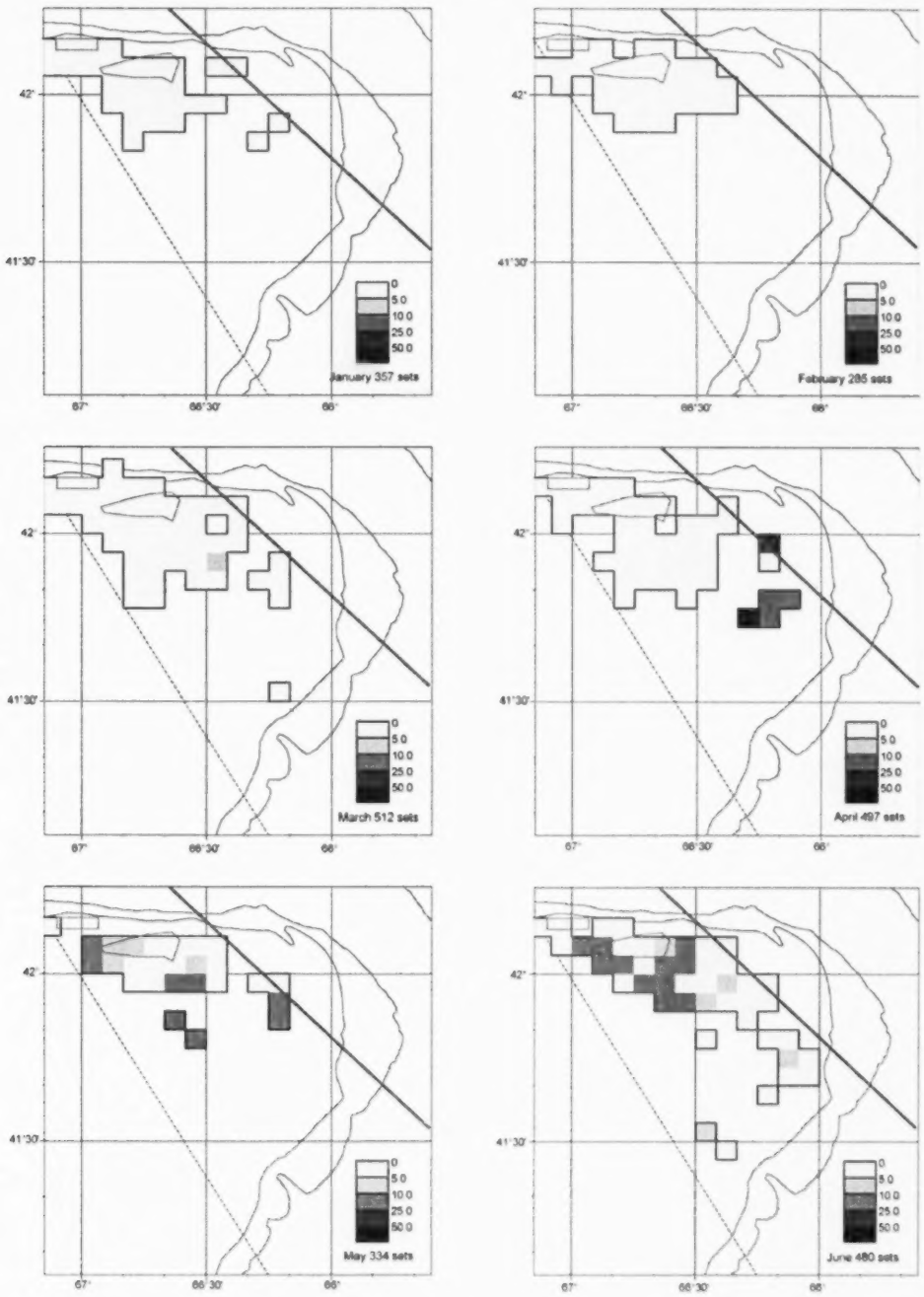


Figure 5: Average catch rates (kg/dredge) for yellowtail flounder from observed scallop trips from 2001 to 2010 (except 2003) on Georges Bank. The areas outlined in red are the voluntary scallop seed closure areas that were in place in 2010.

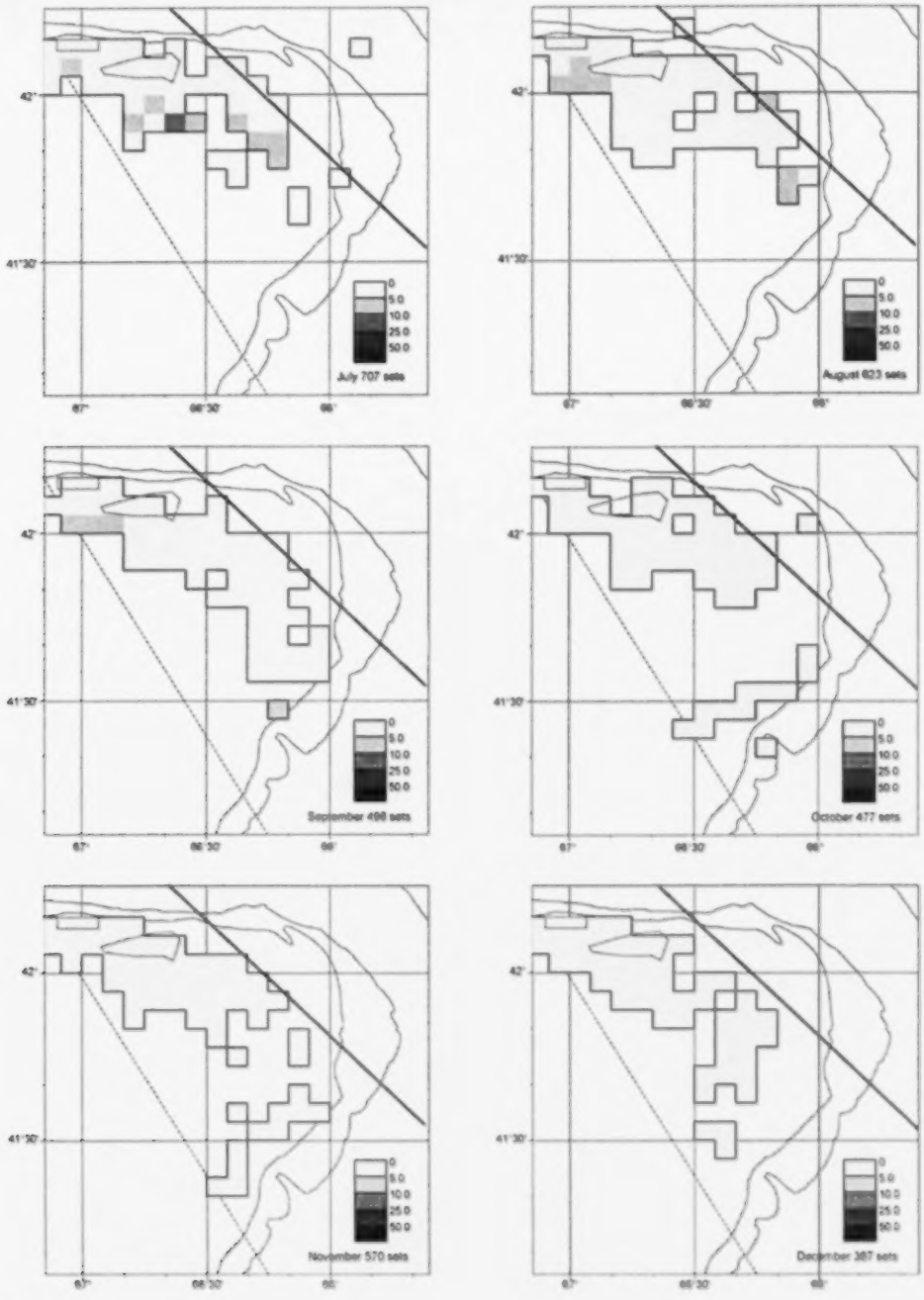


Figure 5. (Continued).

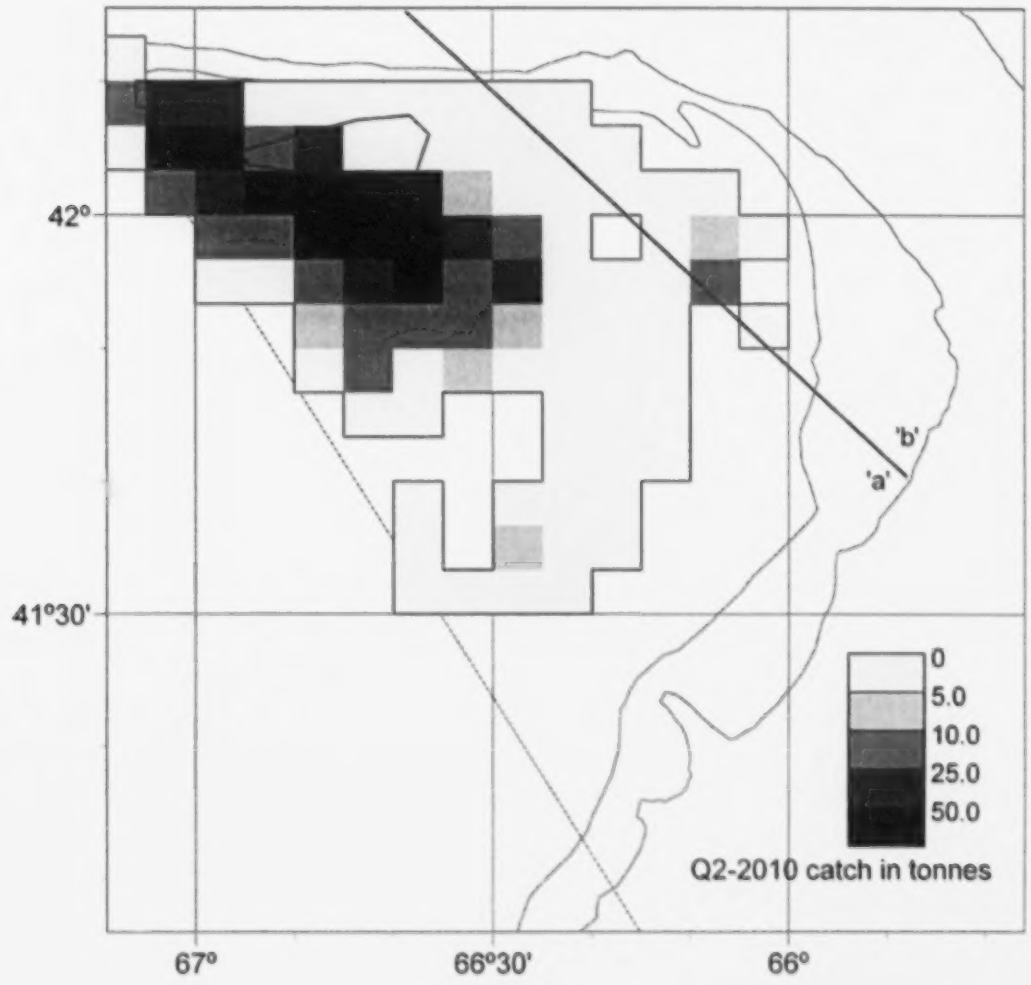


Figure 6: Distribution of offshore scallop catches (tonnes of meats) during the second quarter of 2010. The areas outlined in red are the voluntary scallop seed closure areas that were in place in 2010.

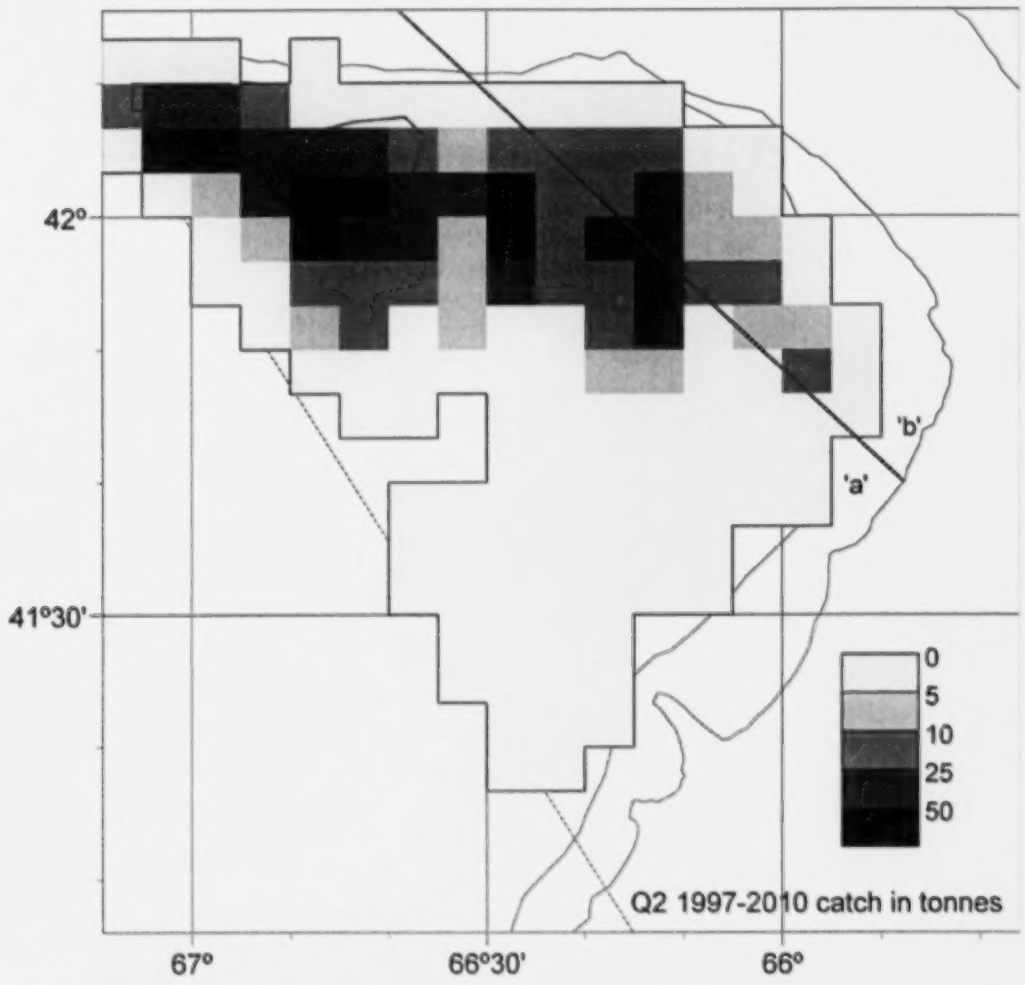


Figure 7: Average scallop catch (tonnes of meats) per cell during the second quarter of the period 1997 to 2010. The areas outlined in red are the voluntary scallop seed closure areas that were in place in 2010.

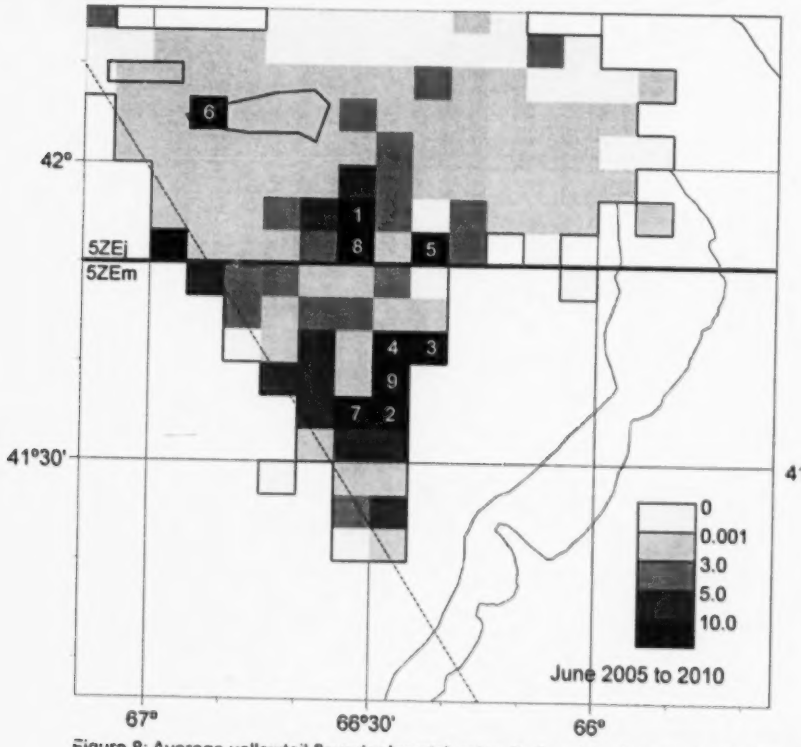
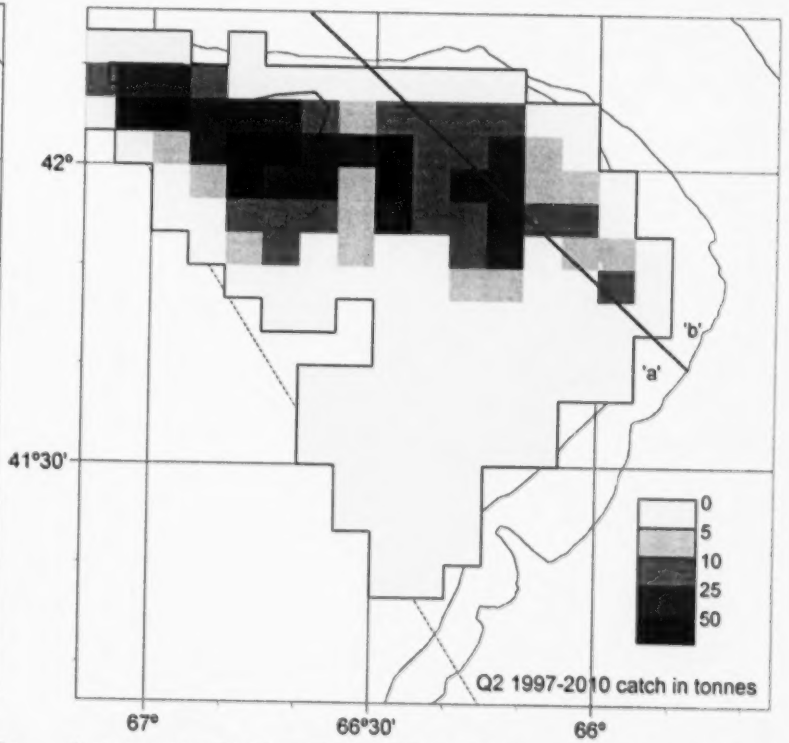


Figure 8: Average yellowtail flounder bycatch rates (kg/hour) for the months of June during 2005 to 2010 for observed otter trawl sets on Georges Bank. Cells located on the Canadian side with rates greater than 10 kg/hour are labeled in descending order.



Average scallop catch (tonnes of meats) per cell per year during the period 1997 to 2010. The areas outlined in red are the voluntary scallop seed closure areas that were in place in 2010.

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